PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH
COLUMBIA

A Reconnaissance Survey of Bruce Lake

D. A. Jesson
1989

PWFWCP Report No. 86

105-02920/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

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A RECONNAISSANCE SURVEY OF

BRUCE LAKE

WATERSHED: Parsnip River

DATE OF SURVEY: July 5, 6, 1989

FIELD CREW LEADER: D. A. Jesson

FIELD ASSISTANT: M. G. Labach

REPORT PREPARED BY: D. A. Jesson

WILLISTON FISHERIES PROJECT

B. C. HYDRO

ENVIRONMENTAL RESOURCES

AND

RECREATIONAL FISHERIES BRANCH

MINISTRY OF ENVIRONMENT

RELEASED BY: D.H.G. Ableson, Regional Fisheries Biologist

LAKE: Bruce

SYSTEM NAME: unnamed C

A.S.A.P. REFERENCE NO.:

SYSTEM NO.: 25-1270

DATA ON FILE FOR THIS SURVEY

Location	x	Dissolved O2/Temp. Profiles	x
Physical Data	x	Netting Record	x
Bench Mark	x	Lake Catch Summary	x
Terrain Features	x	Individual Fish Data	-
Access	x	Fish Preserved	-
Resorts and Campsites	x	Stomach Analysis	-
Other Developments	x	Scale Reading	-
Obstructions and Pollutions	x	Location of Inventory Sites	x
Special Restrictions	x	Photograph Directory	x
Aquatic Plants	x	Appendices:	
Wildlife Observations	x	A: Water Chemistry Analysis	x
Miscellaneous Comments	x	B: Tributary Stream Data	-
Lake Drainage	x	Bathymetric Map Reduction	x
Fisheries Management Comments	x	Bathymetric Map	x
History of Previous Surveys	x		
Water Chemistry Summary	x		

LOCATION

Location:	23 km SE of Mackenzie		
Elevation:	747 m ±		
Latitude/Longitude:	55°08'29":122° 54'49"		
U.T.M.:	10.5056.61103		
Management Unit:	7-30	N.T.S. Map No.:	930/2

Drainage: Outlet C-->swamp-->Parsnip R-->Williston Lake (Parsnip Reach)-->Peace R.

PHYSICAL DATA

Lake Drainage Area:	- sq. km	Volume:	3,490,000 cu. m
Water Surface Area:	388,000 sq. m	Flushing Rate:	
Area above 6 m contour:	147,000 sq. m	Perimeter of Islands:	- m
Shoreline Perimeter:	3,500 m	Number of Islands:	0
Maximum Depth:	19.0 m	Mean Depth:	9.0 m
Filterable Residue (TDS):	38 mg/l	Secchi Reading:	5.9 m

Sounding Device: Lowrance X-15

Elevation Source: Contour interpolation

BENCHMARK

(Iron spike, center of red circle) located 2.0 m above present water level in a 20 cm diameter spruce tree, along the west shore of the lake, near the outlet. The tree is located 5.5 m from the water's edge.

High water mark: 0.5 above water level at time of survey.

Lake: Bruce

TERRAIN FEATURES

Immediate Shoreline:

The shoreline is moderately steep to steeply sloped around the entire lake except for gently sloped terrain along the NE and SE shores (marshes). The lake bottom drops off quickly from shore except for the marsh areas at the ends of the lake. A 15 m shoal extends from shore near the outlet. Boating access to the shoreline is only fair due to a 2 m fringe of Equisetum around the shoreline perimeter with dense patches at the ends of the lake. The amount of deadfall along the shoreline is low. Shoreline access by foot is generally poor due to the dense timber and underbrush along the lake shore perimeter. Access, once developed, would be best near the outlet. A fringe of alder exists around the entire shoreline and is particularly dense at the marsh ends. Shoreline substrate along the west and east shores consists of gravels with an overlying thin layer of silt. A fine organic substrate characterizes the marsh areas at the ends of the lake.

Surrounding Country:

The surrounding country is characterized by low-lying, gently rolling hills. The dense forest cover consists of mature stands of mixed spruce, Lodgepole pine, birch and poplar, with the undergrowth consisting primarily of alder. A logged area is present to the north approximately 100-150 m from the lake. One other logged area is visible to the NE from the north end of the lake. A bedrock outcrop, see arrow in airphoto, is present along the east shore approximately 100 m from the lake. It is not visible from the lake.

Bruce Lake is situated within the sub-boreal spruce biogeoclimatic zone.

Lake: Bruce

ACCESS

Directions:

Bruce Lake is approximately a 5 minute flight by helicopter from Mackenzie Junction (junction of Highway 97 and Highway 39).

According to the owner of the Mackenzie Junction store, Gil Albert, access can be gained to the lake via a path from the edge of the cut block (north shore) through a fringe of trees to the north shore of the lake. Access to the cut block is by a logging road off of Highway 39. This access route was not investigated, but appears to involve a 100-150 m trek by trail down a steep forested hillside, from the cutblock to the lake.

Road Type and Conditions:

Highways 97 and 39 are good, paved, 2 lane highways. The condition of the access logging road and trail are unknown.

Restrictions:

No restrictions were noted.

RESORTS AND CAMPSITES

There are no developed camp areas; however, there was evidence of camping (old fire pits) on the west shore of the lake at the outlet. If a recreation site was ever to be established on Bruce Lake this would be the ideal location. Jim Ladds, Forest Recreation Officer in MacKenzie, will have recreation site and access improvements recommended to him.

OTHER DEVELOPMENTS

A game storage tree fort is located on a point of land on the west shore of the lake, 500 m north of the outlet.

Lake: Bruce

OBSTRUCTIONS AND POLLUTIONS

An old, overgrown beaver dam located on the outlet at the lake is an obstruction to fish passage. The dam is 29 m in length and 0.65 m in height.

SPECIAL RESTRICTIONS

No special restrictions were noted.

AQUATIC PLANTS

Aquatic plants were moderately abundant to very abundant occurring primarily in the shallows near shore. The following species were identified in the field. None were collected.

Nuphar sp.
Equisetum fluviatile
Potamogeton richardsonii
Myriophyllum sp.
water moss (Bryophyte)

WILDLIFE OBSERVATIONS

Two moose and two loons were sighted.

MISCELLANEOUS COMMENTS

Vehicle traffic from Highway 97 could be heard.

Bathymetric map: The lake outline is from an enlargement of aerial photograph BC 77092 N°188, flown August 15, 1977.

LAKE: Bruce

LAKE DRAINAGE

General:

Stream systems of the Bruce Lake drainage consist of one intermittent inlet and one outlet. NTS map 930/2 edition 3 indicates the outlet flows east 6.5 km through low-lying terrain to the Parsnip River. According to Jim Ladds, Forest Recreation Officer in MacKenzie, the outlet does not flow into the Parsnip River, but rather into a swamp some distance from the Parsnip R..

Major Systems:

There are no major systems.

Minor Systems:

A 200+ m back channel is found at the south end of the lake. It drains a low-lying area and consists of a series of braided channels and small (3 m x 4 m maximum size) pools. There was no or very little flow at the time of survey and no fisheries value.

Unnamed C - inlet #1

This small intermittent creek is badly overgrown and enters the north end of the lake. At 100 m upstream from the lake the creek has a wetted width of 45 cm and a depth of only 3 cm. Flow is negligible. The creek drains a low lying area. There is no fisheries value.

Unnamed C - outlet

The outlet consists of a series of beaver ponds resulting from a number of remnant dams. At the lake, there is an old overgrown dam, 29 m in length and 65 cm in height. The dam is an obstruction to upstream fish migration . A number of remnant dams occur downstream for the next 200 m of surveyed stream. The average wetted width of the ponds is 20 m and the average depth 1.5 m. The ponds are chocked with Nuphar, Potamogeton and Myriophyllum. The bottom substrate is largely soft organics with the occasional gravel/cobble patch mixed with silt. There is no or very little flow. There is no salmonid spawning habitat and only marginal rearing habitat. There appears to be no opportunities for stream enhancement. Some unidentified small coarse fish, probably lake chub, were observed in the outlet.

FISHERIES MANAGEMENT COMMENTS

Bruce Lake is barren except for a population of lake chub. With a maximum depth of 19 m and at present oxygen levels stocking with rainbow trout is recommended. Brook trout cannot be stocked due to the potential of the fish entering the Parsnip River system via Bruce L. outlet. Bruce Lake should be managed for a moderate use fishery once road access is established. The lake will require a continuous stocking program as there is no salmonid spawning habitat.

Consideration should be made to replace the beaver dam on the outlet at the lake with a more permanent dam structure. This would help ensure that no other coarse fish, such as northern squawfish and/or suckers, enter the lake by migrating upstream from Williston Lake.

Post survey note: Bruce Lake was stocked September 18, 1989 with 17,000, young of the year rainbow trout from Dragon Lake Stock. The fish averaged 1.09 g.

HISTORY OF PREVIOUS SURVEYS

Lake Surveys:

None known.

Other Related Surveys:

None known.

LAKE: Bruce

WATER CHEMISTRY SUMMARY Limnology Station Mo. 1

Field Conditions:

Date: July 16, 1989
Time: 0900 hrs Air Temperature: 17°C
Wind Velocity: 10 to 15 km/hr Wind Direction: North
Cloud Cover: 4/10 O.C. Surface Condition: ripple
Secchi Disc: 5.9m Water Colour: yellowish-brown(tannic)

Method(s) Used:

Dissolved Oxygen:	YSI model 58 oxygen/temperature meter
Water Temperature:	YSI model 58 oxygen/temperature meter
Air Temperature:	Hand-held alcohol thermometer
pH (field):	Hach color comparitor
H2S (field):	Hach H2S field test kit
Laboratory Used:	Zenon Environmental Inc. B. C. Laboratory Services
Water Sampler:	Verticle Alpha Water Bottle (Vandorn)
Substrate Sampler:	Substrate sample not taken

Water Sample Chemistry: SEAM Site No: Not determined.

	Sampling Depths	
	Surface (0 m)	Lower (17.0 m)
pH (field)	7.5	6.4
pH (lab)	6.9	7.7
Specific Conductance (lab):	74 umhos/cm	64 umhos/cm
Filterable Residue 105°C(lab)	46 mg/l	38 mg/l
H2S (field)	- mg/l	0 mg/l

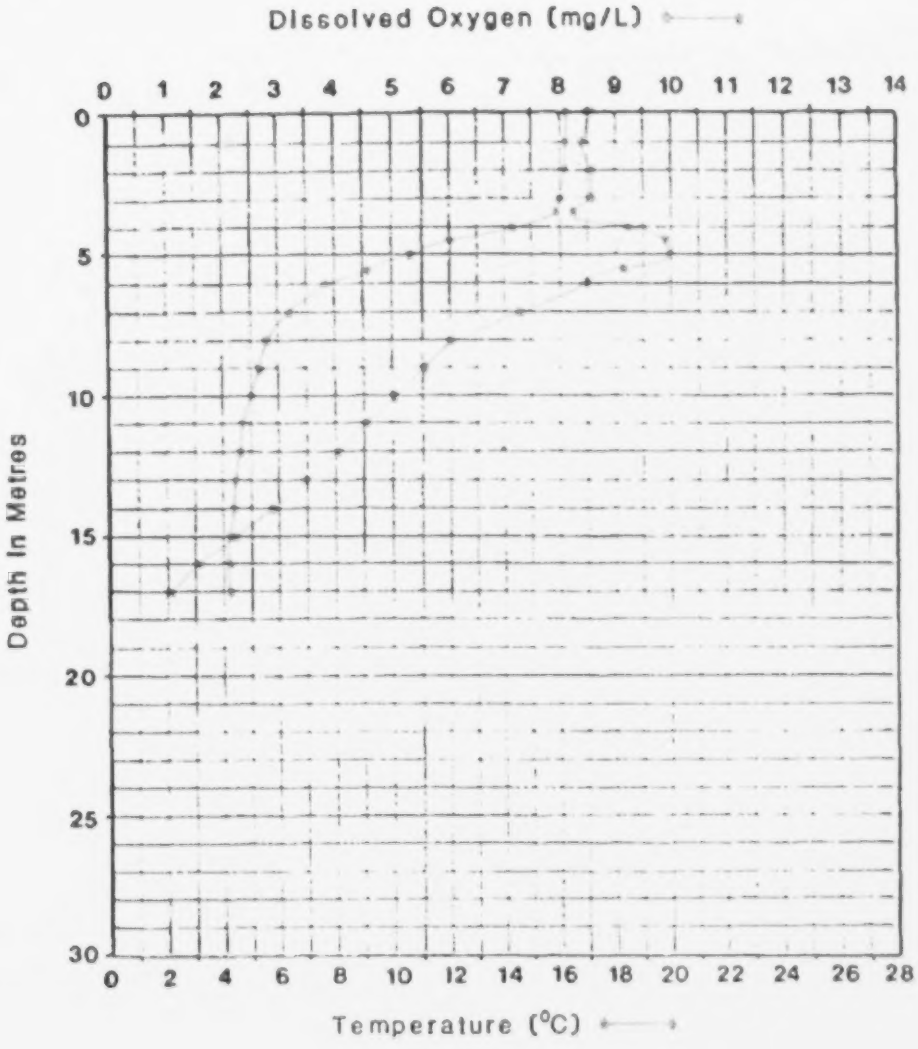
Bottom Depth:	19.0 m
Substrate Sample Depth:	- m

OXYGEN/TEMPERATURE DATA

Depth (m)	02 (mg/l)	Temp (°C)
surface	8.6	16.2
1.0	8.4	16.2
2.0	8.6	16.2
3.0	8.6	16.0
3.5	8.3	15.9
4.0	9.3	14.3
4.5	9.9	12.0
5.0	10.0	10.7
5.5	9.2	9.1
6.0	8.5	7.7
7.0	7.3	6.4
8.0	6.0	5.7
9.0	5.6	5.3
10.0	5.0	5.0
11.0	4.6	4.8
12.0	4.1	4.7

Depth (m)	02 (mg/l)	Temp (°C)
13.0	3.5	4.5
14.0	2.9	4.3
15.0	2.3	4.2
16.0	1.6	4.2
17.0	1.1	4.2
19.0	Bottom	

DISSOLVED OXYGEN AND TEMPERATURE PROFILE



LAKE: Bruce

NETTING RECORD

Mesh sizes experimental order: 25,76,51,89,38,64 mm.

NETTING SITE #1

Type: Sinking Monofilament
Date Set: July 5, 1989. Time: 1610 hrs
Date lifted: July 6, 1989. Time: 0815 hrs
Net Dimensions: Length: 91.4 m. Depth: 2.4 m
Shallow Mesh: 25 mm. Depth: 1.0 m. Substrate: cobble, gravel and some overlying silt
Deep Mesh: 64 mm. Depth: 8.0 m. Substrate: organics

Comments: No fish in net, except for lake chub in 25 mm panel.

LAKE: Bruce

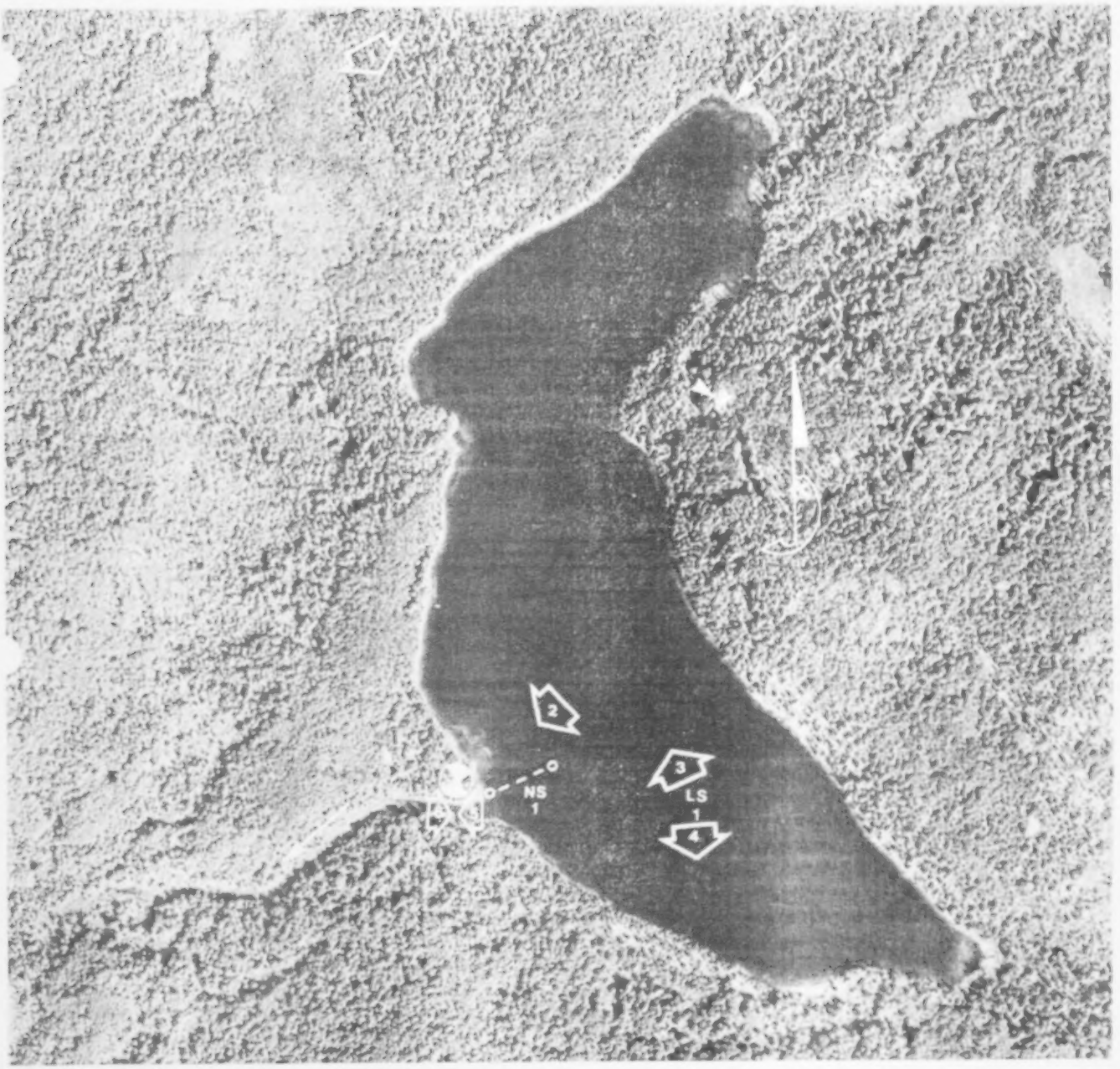
LAKE CATCH SUMMARY

SPECIES	NETTING SITE NO				ANGLED	OTHER	TOTAL	NUMBER SAMPLED	NUMBER PRESERVED	SIZE RANGE (cm)
	1	2	3	4						
Lake Chub	12						12	---	----	9.4 - 11.9

MINNOW TRAPS:

BAIT: sardines

#	HOURS	DEPTH (m)	SUBSTRATE	SPECIES	SIZE RANGE (cm)
1	16.5	0.5	gravels fines	1 tadpole; 7 leeches; 132 lake chub	Average 9.0
2	16.25	0.4	silt	1 leech; 196 lake chub	Average 9.0



1 Plate number, area, and direction

2 Point sample, number, and location

Bench mark

LS 1 Limno station location and number

NS 1 Netting site location and number

1 Stream flow direction and number

LAKE: Bruce

PHOTOGRAPH DIRECTORY

Negative #	Plate #	Description
R6:6A	1	Aerial view of Bruce Lake looking south. One point of access to the lake is through the cut block to the right in the photo.
R6:13A	2	Aerial view of outlet creek on the west side of Bruce Lake. Note the series of beaver dams and resulting ponds, with little in the way of fisheries potential. The point of land on the right bank of the outlet at the lake is a potential recreation site location.
R6:19A,20A,21A	3	Panoramic view of Bruce Lake shoreline looking north from the limno station.
R6:17A,18A	4	Panoramic view of Bruce Lake shoreline looking south from the limno station.
R6:24A	5	View downstream of outlet from beaver dam at lake.
R6:22A	6	View upstream on outlet at the old, overgrown beaver dam at the lake. The dam is 29 m in length and 65 cm in height, and appears to be an upstream obstruction to fish movement.

BRUCE LAKE

Plate 1: Aerial view of Bruce Lake looking south. One point of access to the lake is through the cut block to the right in the photo.

Plate 2: Aerial view of outlet creek on the west side of Bruce Lake. Note the series of beaver dams and resulting ponds, with little in the way of fisheries potential. The point of land on the right bank of the outlet, at the lake, is a potential recreation site location.

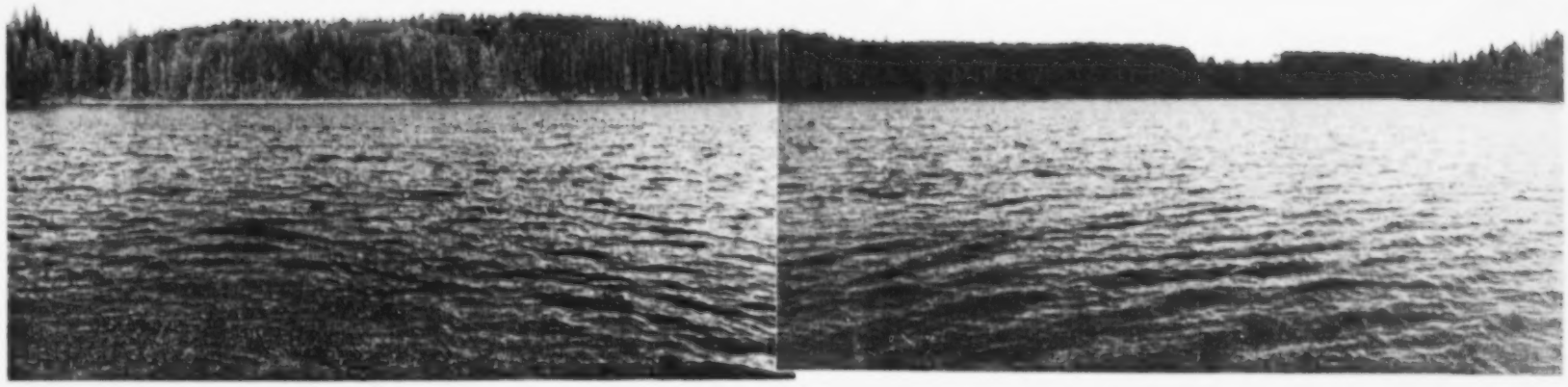


Plate 3: Panoramic view of Bruce Lake shoreline looking north from the limno station.

Plate 4: Panoramic view of Bruce Lake shoreline looking south from the limno station.

Plate 5: View downstream of outlet from beaver dam at lake.

Plate 6; view upstream on outlet at the old, overgrown beaver dam at the lake, The dam is 29 m in length and 65 cm in height, and appears to be an upstream obstruction to fish movement.

Appendix A - LABORATORY REPORT
Water Chemistry Analysis

B.C. LABORATORY SERVICES
Report for form 03000106
Peace - Fish Program ATTN: DUANE JESSON

Site: NOSITE BRUCE LAKE

Submitted by (00000) DUANE JESSON

Address (07) ~~Waste Management Branch~~ Recreational Fisheries
~~Northern Region~~
~~3rd Floor~~ 1011 4th Avenue
Prince George, BC V2L 3H9

Phone No. 565-6944

Audit Sample ( )
Client study reference code ( )
Sampling agency code (91)

Site (NOSITE) BRUCE LAKE

Sample Adjective ( )
Sample State (FW) Fresh Water
Sample Descriptor ( ) Undefined

This form was processed to the computer on 7-JUL-1989 as REGULAR
The cost for analyzing samples for this form is

utine analysis:	$	112.80
pecial analysis:	$	0.00
Total	$	112.80

Site: NOSITE BRUCE LAKE

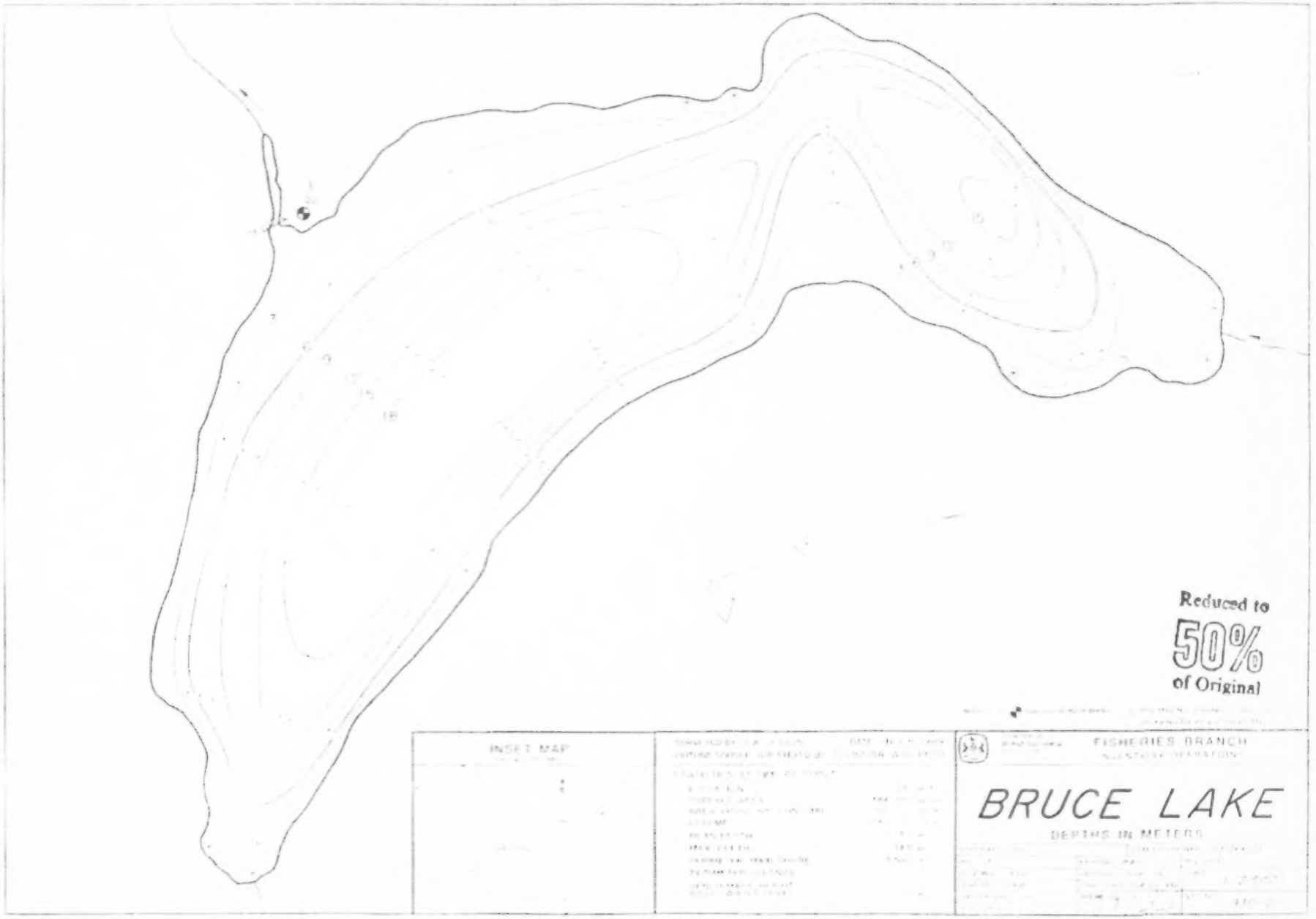
From : 89/07/06: 0001 To : 89/07/06: 0001
Depth Range : 0.0 0.0 Tide :
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Pres'n)
pH	6.9	pH units	Automated pH Meter (00041220/02/01)
Residue Nonfilt.	1	mg/L	Gravi 9 cm Buchner, 105C (00081070/02/01)
Specific Conductance	74	uS/cm	Cond. Meter Siebold (00111160/02/01)
Res. Filterable 1.0u	46	mg/L	Gravimetric 1.0u Filter (007H1032/02/01)
Alkalinity Total 4.5	39.0	mg/L	Automated Electrometer (01021210/02/01)

Site: NOSITE BRUCE LAKE

From :89/07/06:0002 To :89/07/06:0002
Depth Range : 17.0 17.0 Tide :
Sample State: Fresh Water
Sample Comment:

Parameter Description	Result	Units	Analytical Technique (Sparcode/Medium/Pres'n)
pH	7.7	pH units	Automated pH Meter (00041220/02/01)
Residue Nonfilt.	< 1	mg/L	Gravi 9 cm Buchner, 105C (00081070/02/01)
Specific Conductance	64	uS/cm	Cond.Meter Siebold (00111160/02/01)
Res. Filterable 1.0u	38	mg/L	Gravimetric 1.0u Filter (007H1032/02/01)
Alkalinity Total 4.5	34.6	mg/L	Automated Electrometer (01021210/02/01)


Reduced to
50%
of Original
INSET MAP
FISHERIES BRANCH
BRUCE LAKE
DEPTHS IN METERS